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SPECIFICATION FOR RECOMMENDATIONS FOR LIGHTING OF DENTAL OPERATORIES

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SPECIFICATION FOR RECOMMENDATIONS FOR LIGHTING OF DENTAL OPERATORIES

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Indian Standard

SPECIFICATION FOR RECOMMENDATIONS FOR LIGHTING OF DENTAL OPERATORIES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 September 1981, after the draft finalized by the Dental Equipment Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

0.2 Dental operatories are illuminated by day light and any specific requirement of illumination is fulfilled by artificial light source of suitable size and shape. Now a days this condition is not usually fulfilled in any of the dental rooms because of the better artificial illumination and airconditioning. This standard prescribes general lighting conditions and recommendations to be followed in illuminating dental surgery rooms or operatories.

0.3 In preparing this standard, assistance has been derived from DIN 67 505 Lighting of dental operatories, recommendations. Deutsches Institut für Normung, Federal Republic of Germany.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2 - 1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard recommends general requirements of artificial lighting in dental clinics and dental operatories.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 1885 (Part XVI/Sec 1) - 1968† shall apply.

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*Rules for rounding off numerical values (*revised*).

†Electrotechnical vocabulary: Part XVI Lighting, Section 1 General aspects.

3. REQUIREMENTS

3.1 Light used in the dental clinic may be a mixture of day light and artificial light. The lighting shall be so designed that together with other light sources there shall be no excessive difference of illumination density. Lighting shall also facilitate special task like selecting of fine instruments and teeth. Special attention shall be paid to the direction of incident light, the blending and also the question of light colours.

3.2 To meet the requirements specified in **3.1**, every dental operation room shall have illumination devices so that a pattern of illumination as shown in Fig. 1 is obtained:

Region R_1 — General illumination of the room (300 lux).

Region R_2 — Illumination of operation region (ambient illumination) (1 000 lux).

Region R_3 — Illumination of the operation field (actual working zone) (more than 8 000 lux).

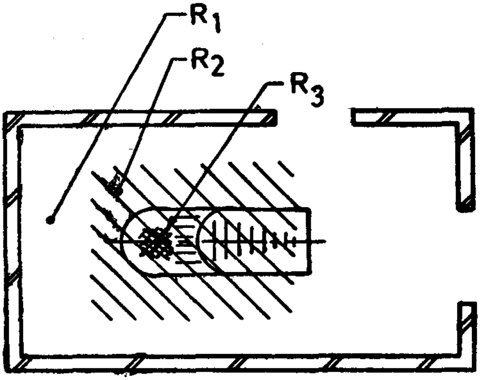

FIG. 1 PATTERN OF ILLUMINATION IN VARIOUS REGIONS OF DENTAL OPERATORY

3.2.1 General illumination of the room shall be not less that 300 lux (Region R_1). This light colour in Region R_1 shall agree with that of operating Region R_2.

For illumination, fluorescent lamps giving off white day light type of light having colour near to colour temperature of $5\,500\ ^{+1\,000}_{-750}$ K is recommended.

In general, the operating table lighting fittings employ tungsten lamps and produce a very high level of illumination, with very good colour rendering properties, but it is not advisable to use filament lighting for the general lighting of the theatre because of the additional heat output that would be produced by this form of lighting. It is more practical to use fluorescent light sources which inherently have low heat output, yet have the added advantage that they can produce good colour rendering for medical purposes.

Of the walls and ceiling of the room, ceiling plays the important role. The ceiling shall have a very high degree of reflectivity of not less than 0·75. It should also be matt finished so that it does not dazzle when the face of the patient sitting or lying on the dental chair is directed towards the ceiling. The reflectivity of the walls shall be not less than 0·5 and that of the furniture used in the clinic shall be not less than 0·3. The surfaces in the Regions R_2 and R_3 shall be matt finished so that they do not dazzle the eyes. To avoid difference of light density, it is also recommended that the overalls of doctor or his assistants and cloth covering the mouths hall be made of matt material with reflectivity of less than or equal to 0·3. Preferably, all instruments and the trays for them shall be matt finished.

If windows are visible and are of dark appearance during night time, these shall be brightened up with suitable curtain or ground glass lighted up properly from above but it should not dazzle. The colours of the light chosen and that of objects in the room shall be soothing to the patient.

3.2.2 *Illumination of the Operation Zone* (*Region* R_2) — The illumination in this region shall be at least 1 000 lux. The lights shall be located abov eand in front of the patient. The overhead light, if used, shall be easily adjustable. Large area lights should be preferred because the dazzling effect is decreased with their use. The lights used shall give the colour corresponding to the light temperature of $5\,500\,^{+1\,000}_{-750}$ K. The colour transmission index of the source shall be at least 90.

3.2.3 *Illumination of Operation Field* (*Region* R_3) — The light source shall be about 80 cm above the head of the patient and shall be capable of giving an illumination of 8 000 lux or above in the mouth opening. For varying illumination, controls of illumination shall be possible depending on the task at hand. The light zone by this light shall be of height $10\,^{+0}_{-1}$ cm and width $20\,^{+0}_{-2}$ cm.

To prevent the patient from the resulting dazzle, the light zone shall be limited rather sharply at the top and a uniform decrease of illumination downward and sideward.

For special tasks deep in mouth, an additional pencil beam light is recommended. The light colours of this light shall be close to each other to minimize disturbance by colour shadow.

The temperature increase at 80 cm away from source caused by illumination of light shall be not more than 5 K.

3.3 Stroboscopic Effect — A stroboscopic effect on moving parts which can affect vision shall be reduced by suitable means like using two or three phase circuits.

3.4 Contrast Formation — In those operations, where the shape and surface finish of an object has to be determined, added illumination source should be provided for sufficient contrast.